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# (54) Keyboard with extra functions obtained by pressing key combinations

(57) A manual entry keyboard system for data processing with as few as twelve keyswitches produces enough entry signals for direct alphanumeric input of characters, one character per finger stroke of a single finger at high speeds from a single hand in a touch typing mode. Extra characters are entered by single finger strokes bridging 2 or 4 adjacent keys. The keyboard can be adapted by changing keyswitch modes for direct entry in numeric calculation, alphanumeric data processing and the like modes (see Fig. 4). To further improve accuracy of manual keyboard input, (1) the reach of the fingers from home keys in touch typing position is reduced (see Fig. 6), (2) different key locations are touch coded by keyboard elements such as depression, textured and ridge contour configuration on a keyboard surface, (3) the keyswitches are located side-by-side in a single field for compact use on pocket sized version with advantages of maximizing the number of selections and reducing errors by reduction of the reach from a home key position. A twelve key symmetrical telephone type matrix will provide full alphabetic capability as well as numeric and thus can serve by itself to replace PBX type telephone switchboards while processing numeric signals in a conventional manner.

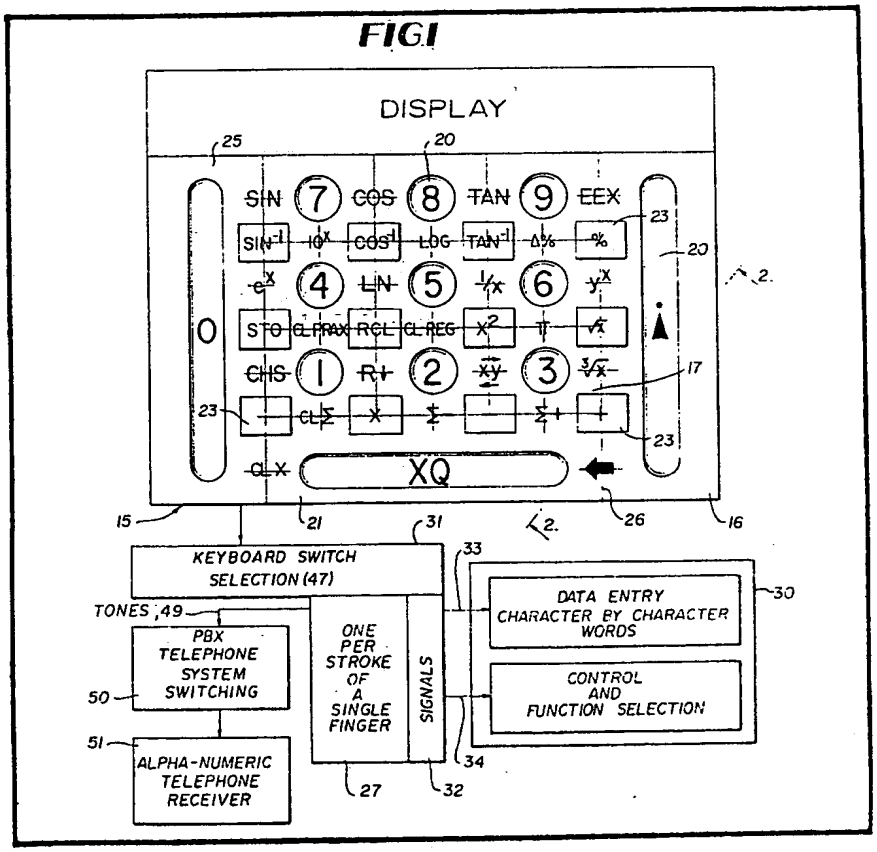


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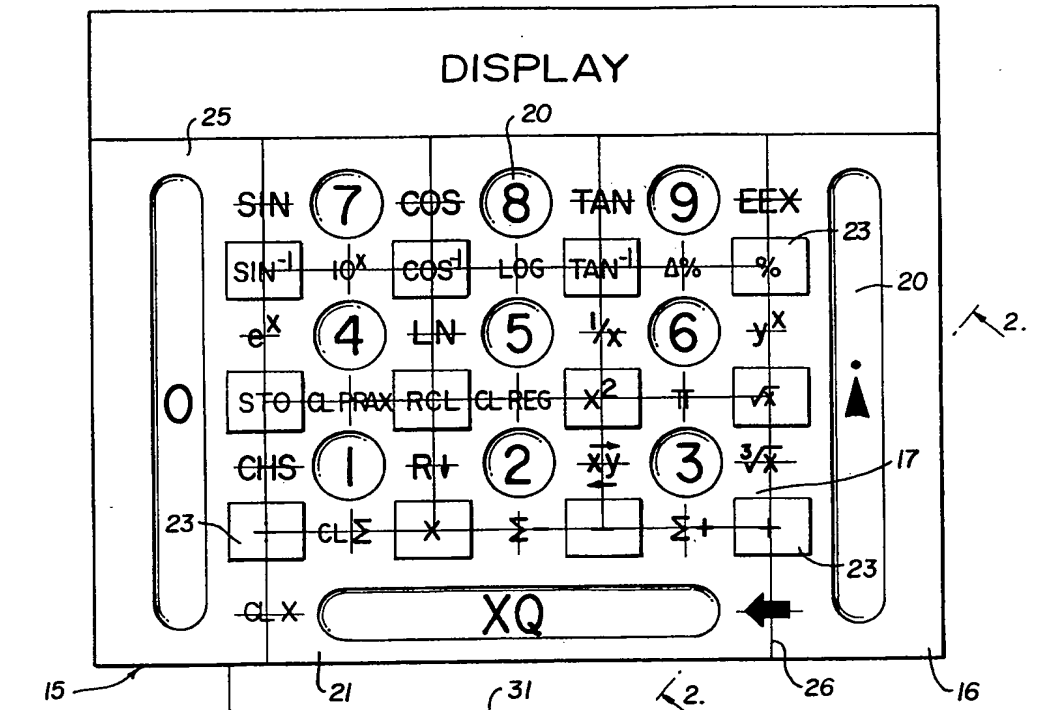
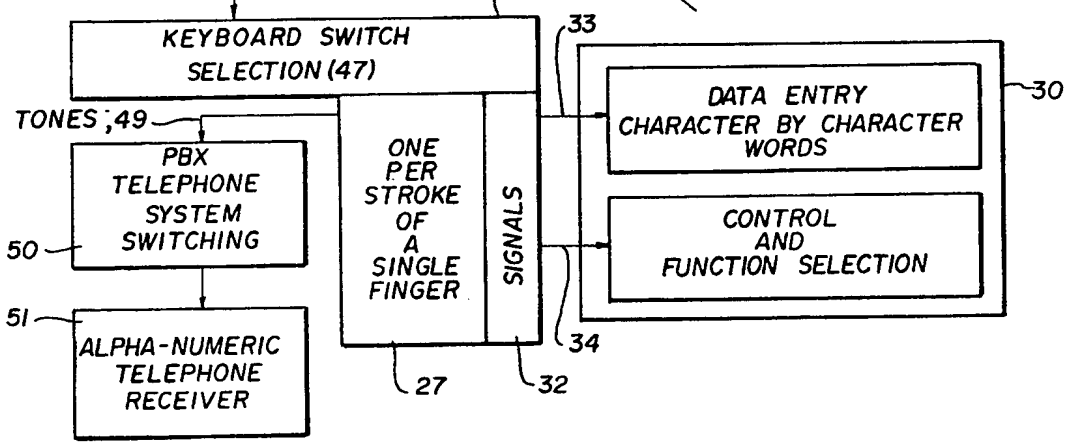
FIG.1



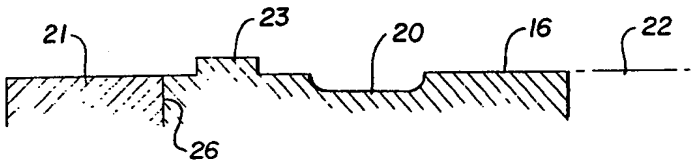




FIG.2

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FIG.3

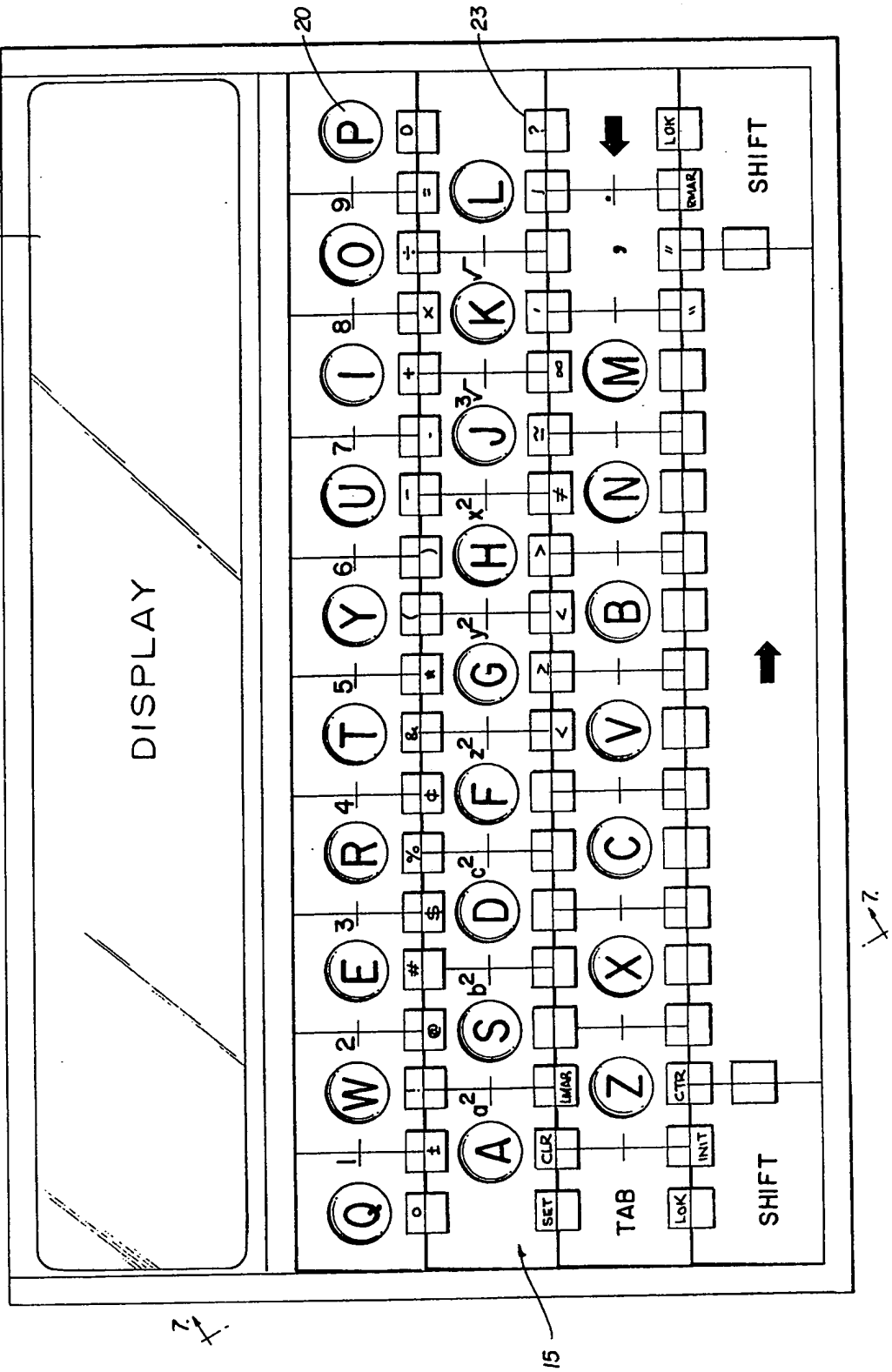

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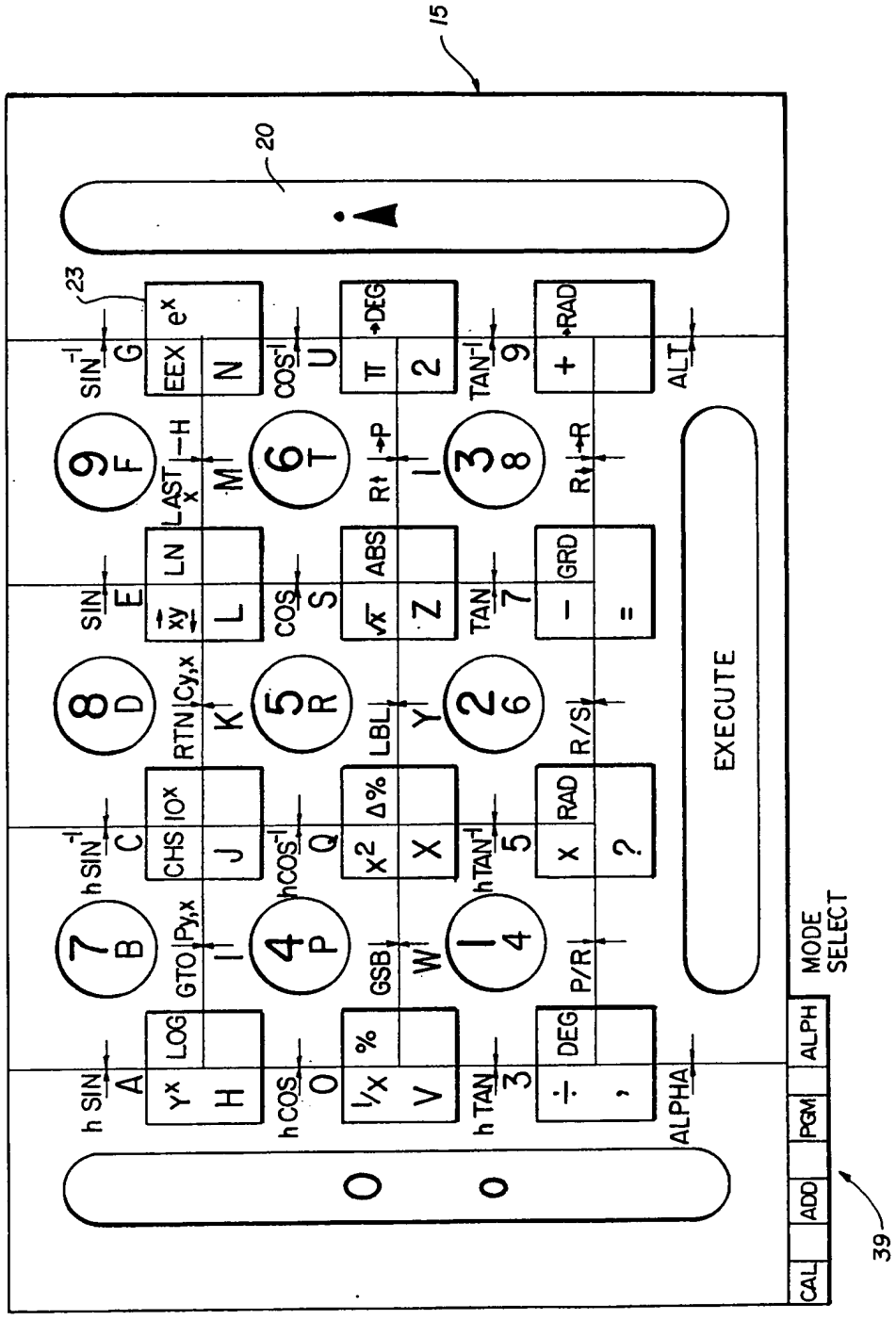
FIG.4



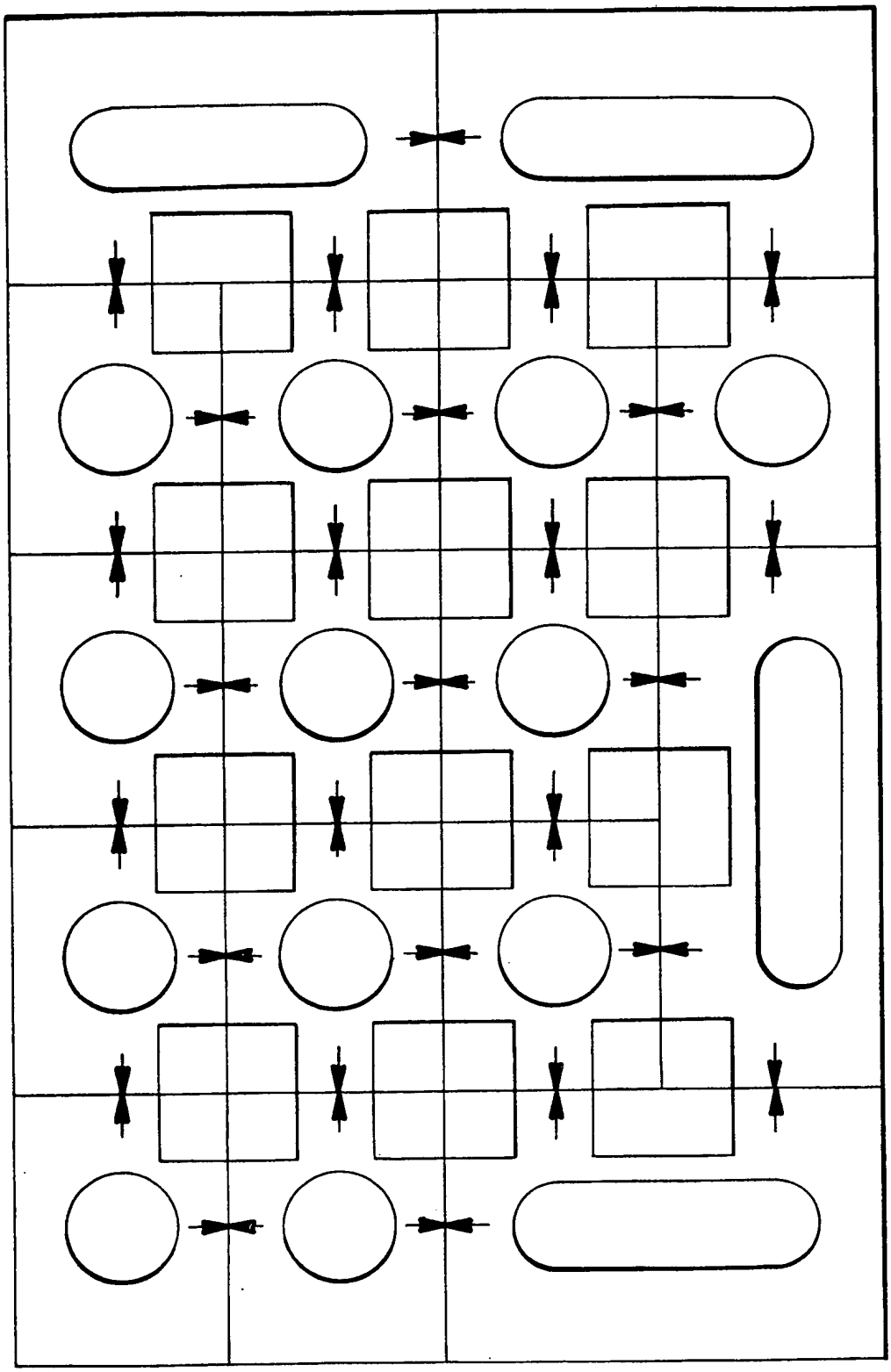


FIG.5

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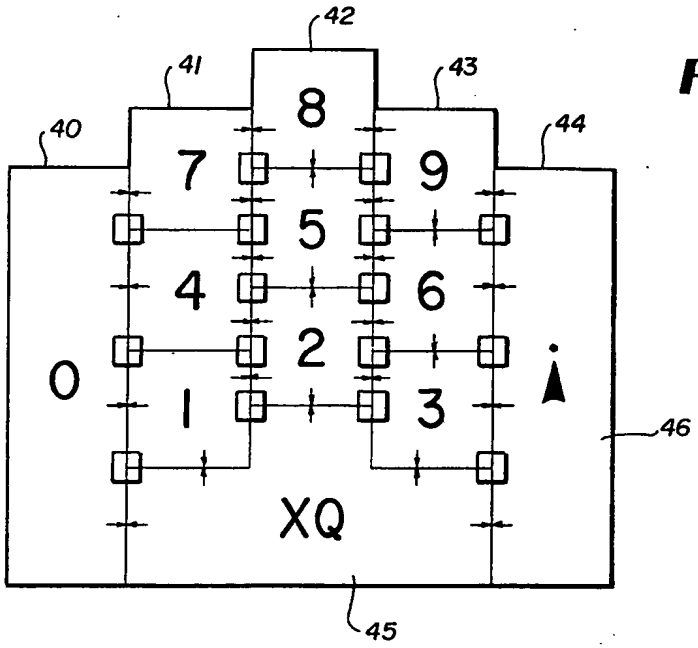


FIG.6

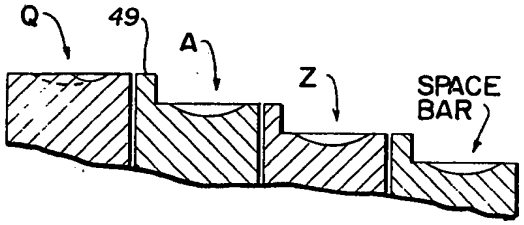


FIG.7

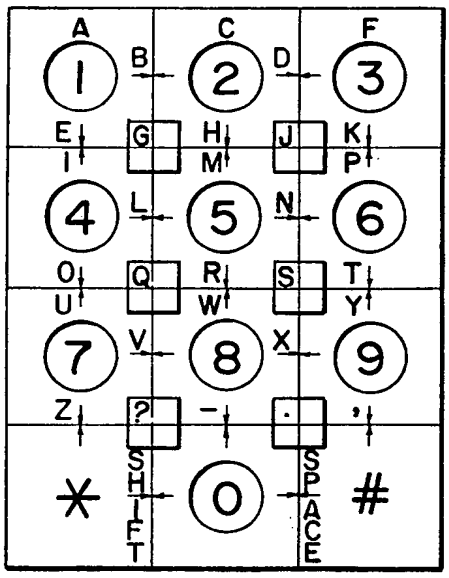


FIG.8

SPECIFICATION

# Contoured touch type data processing keyboard

## Technical field

This invention relates to electronic data processing equipment and more particularly it relates to keyswitch type manual entry keyboards for both entry of data and functional control of data processing operations.

## Background art

This application is a continuation-in-part of my copending application Serial No. 488,692, filed April 26, 1983 for Improved Manual Data Entry in Data Processing Systems.

A significant bottleneck in the use of electronic computers and other data processing equipment is the human input interface equipment usually in the form of keyboards. Modern electronic data processors have out-stripped the capacities of conventional keyboards by providing capability for handling literally hundreds of control functions and data characters on a single low cost chip. Also any manual input keyboard is sensitive to manual input speed and potential entry errors caused by either equipment characteristics or human error. The need for improved speed, accuracy and high data handling capacity in manual entry keyboards is evident. A further desirable feature is minimal size compatible with portable size computers, which constitute a considerable percentage of the market demand. For small keyboard panels of the prior art there is generally only room for operation by one hand, which further tends to restrict keyboard speed, accuracy and capacity.

Some prior art techniques are proposed to increase keyboard capacity for data processing applications, such as (1) the "chord" system of selection of keys either one or several at a time set forth in U.S. Patent 4,042,777—F. C. Bequaert et al.—Aug. 16, 1977 or German 2924515—Jan. 15, 1981, (2) the use of the available keyboard keys in several different modes as set forth in U.S. Patent 3,892,958—C. C. Tung—July 1, 1975 and (3) the use of counted sequential closures of keys a plurality of times to provide a larger number of selections per key as set forth in U. S. Patents 4,202,038—S. A. Petersson—May 6, 1980 and 4,272,826—S. Deutsch—June 9, 1981. However, these keyboards all tend to increase the error rate of manual input data by requiring the operator to make mental choices including those which select how many fingers and how many finger strokes are required for an entry. The same is true if a keyboard has a larger number of keys so that an operator's hands get out of register for touch operation, or must have a large reach or hand movement span encompassing a large number of keys.

It is therefore an objective of this invention to improve the manual entry data processor keyboard art by providing structure to reduce errors, improve capacity and increase speed.

## Disclosure of the invention

This invention provides electronic keyboard switching equipment for manual data entry and control of electronic computer and data processing equipment that permits faster more accurate manual input of data. Also, high keyboard capacity is achieved in a compact size to compatibly relate to modern chip and portable sized computer requirements and thereby make available an extensive range of the available built-in data processing functions.

One significant factor in producing fast and error free manual keyswitch entry is the provision of an inter-acting set of elements eliminating mental choices of the operator to determine which selection to make or which set of fingers to use. If a piano player first attempts to play rapidly a new song without practice it would be difficult to play all chords without error because of the mental process in choosing the number and locations of the necessary fingers. Rather a typist sequentially using one finger at a time to enter one character at a time can rapidly type new text with a mechanical action that substantially eliminates errors. This then is the limited mode of operation provided by this invention together with other cooperating keyboard features that also result in comprehensive choice of many selections, rapid data production and few errors.

To significantly increase the key-to-signal selection efficiency, a single finger stroke may choose the individual keys one at a time plus a large number of "virtual" keys afforded by stroking two or more side-by-side keys simultaneously.

It is significant to a typist or other keyboard operator to be able to find and rest the fingers in a ready home position from which the finger reach provides access to the entire keyboard. Thus, an error reducing feature is incorporated and accented by this invention by means of producing a keyboard contour that lets the fingers feel by touch that they are in home position or on a correctly selected key when reaching out. This tactile feedback also supplements the movement of the keyswitch for each entry so that the operator knows one character is complete and another may immediately follow. This feature is characterized by tactile feedback markers to be sensed by a single finger in each entry position showing that the finger is registered in place for the entry, wherein the markers extend over a plurality of at least two side-by-side keys to encompass those entries which result from simultaneous switching of more than one key-switch. The tactile markers comprise an ordered set of indentations, raised ridge surface portions and flat surface areas, which typically respectively identify selections for the finger position to actuate one, two or more keyswitches. To accommodate tiered row typewriter type keyboards, the tiering overlaps the keys in an

adjacent row to permit a single finger stroke actuation of keys in two adjacent tiered rows.

A preferred keyboard arrangement for one hand touch type entry of alphanumeric data has twelve keys arranged in five columns of keys, which overlap to fit the length of the five fingers on a hand, and thus match a home key position with a normal natural hand posture.

Indicia entered on the keyboard permits visual reference, particularly useful for unusual or less frequently used selections. This is also important if a plurality of different live keyboard modes is available and makes the keyboard selections in different modes self-explanatory without reference to an instruction manual.

Compact size and full alphanumeric entry capacity of each entry with a single finger stroke using a single hand and as few as nine keys is achieved by use of the technique of letting a finger bridge more than one key for concurrent switching of more than one keyswitch per finger stroke, when provision is made for a mode change to select more than one live keyboard set. Direct entry of each character is provided by a single finger stroke on a live keyboard so that high data entry speed is achieved. A twelve key keyboard can provide for example from 47 to 55 separate selections for full alphanumeric capabilities and further choice of a number of functional control signals on a live keyboard. A greater number of keys further expands the number of selections possible without any change of the keyboard mode.

This invention therefore makes it possible with a compact twelve key symmetrical matrix array commonly used for telephone service to attain a full alphabetic mode of 35 characters supplementing the standard twelve choice numerical mode telephone key switch assembly. Thus, forty-seven separate tones can be used and this array is useful in telephone switching systems to replace complex PBX type switchboards.

Other features, objects and advantages of the invention will be found throughout the description, drawing and claims.

**Brief description of the drawings**

In the drawings:

Figure 1 is a sketch of a data processing system partly in block diagram with a manual entry keyboard for entering data and control signals in accordance with the provisions of this invention;

Figure 2 is a partial section sketch showing keyboard profile features afforded by this invention as seen from lines 2—2 of Figure 1;

Figure 3 is a plan view of a keyboard and display embodiment of the invention for manual entry of alphanumeric data with keyswitches laid out in a conventional typewriter keyboard pattern;

Figure 4 is a further keyboard embodiment as shown in Figure 1 illustrating the use of the live keyboard switches in a multiplicity of modes including numeric calculation and alphanumeric modes;

Figure 5 is an alternative keyboard pattern embodiment with sixteen keys arranged for manual data entry by one hand;

Figure 6 is a plan view of a twelve key keyboard embodiment with five rows of keys interlaced to fit the natural position of the fingers, thereby to reduce errors and permit comfortable data entry;

Figure 7 is a profile sketch of the keyboard of Figure 3 when tiered, as taken along lines 7—7, wherein keys in lower rows have portions extended to the adjacent higher level rows thereby to permit a single finger stroke to actuate simultaneously keys in two adjacent rows; and

Figure 8 is a plan view of a twelve key symmetrical matrix keyboard layout of the type commonly used in telephone systems.

**The preferred embodiments**

As laid out in Figure 1, a single field 15 of twelve side-by-side manually operable key-switches 16, 17, etc. provides both input data and operating instructions for a computer or other data processing system, preferably self contained in an appropriate housing such as a portable or desk top sized case. The pertinent data processing-keyboard relationships are shown in block diagram form and a visudal display panel 18 is available for output interfacing. The keyboard is operable live with the keyboard indicia showing available functions and characters selectable. In this case a numerical calculating mode of operation permits digit by digit sequential direct entry by means of a single stroke by a single finger of an appropriate one of the decimal digit keyswitches designated 0 to 9 in the circle or oblong key fitting depressions 20 shown better by the profile view of Figure 2. Note that the symmetry of the layout provides one hand operation by either right or left hands.

For control purposes, key 16 provides for a decimal point entry for the first occurrence in a numerical word. However, for the second such entry in a word (a non-meaningful combination) it will serve as a control function to enter the word into an appropriate register as indicated by the arrow designation. The execute (XQ) key 21 is used to execute command instruction such as for example, to change the computer mode of operation and establish a different set of entries for the live keyboard keys as more completely described in my copending application Serial No. 459,998 filed January 21, 1983 for Computer Keyboards with Few Keys Designating Hundreds of Functions.

Basically this keyboard embodiment has contiguous keys disposed in a field presenting generally a flat surface plane (22, Fig. 2). That surface is contoured by depressions 20 and by raised surface portions 23 which can be felt to aid in touch selection of keyboard entries. Thus, the field of twelve keys is operated by one hand as the typewriter using a single finger for each entry to close a keyswitch (or to concurrently close a combination of keyswitches). The depressions 20

and raised surfaces 23 thus permit the operator to feel the proper finger positions and to know when the fingers are resting in a home position or reaching to the right finger position for entries from a single keyswitch closure. A home position thus in the depressions would be as follows: thumb at 0, index finger at 4, forefinger at 5, ring finger at 6 and little finger at the decimal point.

Each depression thus relates to a single keyswitch actuable by a single finger stroke and the tactile depression markers 20 will feedback to the operator the proper finger position for entries of a single keyswitch closure. The "Virtual" keys of two or more keyswitches simultaneously closed, are also identified by tactile feedback structure. Thus, junctions of two side-by-side keys, including sin 14, $\pi$ and the like, are arranged on a flat surface junction line which is felt by the operator when the finger is in place for a key stroke of this set of virtual (two simultaneous keyswitch single) keys. Similarly, the set of virtual keys for more than two simultaneous keyswitch closures by a single finger stroke are located at the raised ridges 23, which are felt by the operator to assure that the finger is properly registered.

Note that for the virtual keys a tactile feedback member is provided common to two or more keys by extending over a plurality of at least two side-by-side keys. Thus, the operator can "type" with greater accuracy and select with confidence the many key positions available from the set of twelve keyswitches.

If the number of keyswitches is 12 as for example disposed in this keyboard embodiment, as may be seen in Figure 1, forty-seven entry selections are provided. This is achieved by providing output signals in response to actuation of either the twelve single keys independently (0—9, XΩ and.) or the actuation of a plurality of keys concurrently.

In the format of Figure 6 by offsetting columnar keys, the number of selections available from twelve keys is increased to 55. This further adds the desirable feature of conforming the five columns of the keyboard to fit the normal contour of the human hand, where the forefinger is the longest, etc. Thus, a natural home position will further prevent any errors caused by unnatural hand positions required in other keyboard configurations.

It is important for accuracy and speed in manual data entry that the individual characters be selected sequentially one at a time by choice of a single finger as indicated on box 27. Thus, two side-by-side keys such as shown for clear X (CIX) at the intersection of keys 21 and 25 are operated concurrently by a single finger stroke. All of these two concurrent key selection positions are at medium level coplanar (flat) surface finger stroke positions at the junctions where only two keys meet, in accordance with the preferred contour embodiment of Figure 1. See the junction line 26 of keys 21 and 16 in Figure 2, for example, where the back space/clear arrow indicia is seen in Figure 1. Other selections such as sin, cos are evident from the twelve key field embodiment as displayed. The touch at a flat surface joint between keys is readily recognized by an operator as a feedback signal assuring that the fingers are in proper position.

Also a plurality of 3 or 4 keyswitches may be stroked concurrently by a single finger with a single stroke for an entry. These locations are identified by a raised surface rectangle ridge 23 (see Figure 2 also). Thus, for example, divide (÷) or percentage (%) control functions are selected at three key junctions, and $X^2$ for example is selected at a four key junction. Thereby a number of selections far in excess of the number of key switches is provided in this system. The system also affords manual data input speed and accuracy not heretofore available by means of combining the contoured keyboard and the entry of a large number of characters or functions with a single finger stroke to permit touch type data entry in a mode similar to touch typewriting. Note that the maximum reach for selecting characters away from a home finger rest position (0—4—5—6—.) is significantly reduced by the use of the technique of bridging side-by-side keys with the acting data input finger and keeping the side-by-side keys in a single compact field. This means the hand can span a much larger number of key entry positions than on a typewriter type keyboard, for example. Also note that because of the more closely spaced character positions, the contoured keyboard markers are most important in reducing the probability of error, since each class of keyswitch entry (1, 2, 3 keys, etc.) will have its own feel in terms of indentation, flat surface or raised marker ridge. A special texture may be placed at the flat surfaces if desired for more prominent differentiation from other flat keyboard areas out of register. Thus, both the movable keyswitches which must be actuated and the marker feel and feedback signals to the operator to improve the data input accuracy.

The switchboard is readily adapted to communicate with the data processor system 30 by means of a logic decoding switch selection network 31. Thus 47 different signals are derived for the various keyswitch selections on keyboard 15 of Figure 1 and validated as proper keyswitch combinations. The signals for actuating the data processing then comprise a sequence of successive signals selected for each finger stroke (27) and coupled (32) to the data processing system 30 in proper coded form for communication. Thus, both data in the form of characters for forming data entry words (33) and control of function signals (34) are entered by a single finger in a single keystroke.

The keyboard layout may take other forms, such as the conventional two hand typewriter layout pattern having at least twenty-eight separate keys for producing the full alphabet. As seen by the keyboard notation, the flat or tiered (Figure 7) keyboard surface has depressions 20 and raised ridge portions 23 as in the hereinbefore

described contour pattern. In this embodiment, the rows of keys are interlaced to form three key intersections at the contoured positions 23. It is readily apparent that great flexibility of control for a data processing system is provided by this keyboard layout, where space is available. It has the advantage of a standard keyboard layout for two handed typing, but permits a large range of additional live keyboard functions and provides the contour tactile feedback feature.

The twelve key layout of Figure 4 illustrates the comprehensive capabilities of the keyboard system of this invention to effectively use more of the very large number of data processing functions available on modern chips. For illustrative purposes, three different modes of operation are outlined, as may be seen best from the three separate notations on the multiple key intersections with the raised contours 23. For convenience to an operator, the three sets of indicia may be color coded, black, blue and red, for example.

The data processing system is then operated in three modes, such as an alphanumeric data processing mode, a numeric calculating mode, and other specialty modes such as adding machine (ADD) and programming (PGM) modes, as selected by appropriate commands generated from the keyswitches. In this embodiment auxiliary mode selector switches 39 are illustrated. It is seen from the keyboard notation that in the alphanumeric mode, the entire alphabet, all ten decimal digits, punctuation marks, and several command signals are available for one hand entry from the twelve keyswitches. In each mode therefore the keyboard signals are coupled to the data processing system for corresponding communication from a live keyboard, so that each stroke of a single finger will produce a valid entry.

Other keyboard formats may be desired, such as for example, the twelve key telephone type keyboard of Figure 8 or the sixteen key version of Figure 5. In each case, the keyboard is located in a single field and is preferably accessible by one hand leaving the other free for other purposes. By placing all the keys in a single field, a greater number of keyswitch combinations is available. Also, the keyswitch layout then can be designed for fewer mental choices by the operator, thereby decreasing error rates. Also to decrease the error rate and provide essentially mechanical entry of data even from unrehearsed copy, each entry is made in sequence by action of a single finger, as in touch typewriting. It is seen therefore that accurate, high speed data and control function entry is achieved very efficiently and comprehensively with few keys.

In Figure 6, the keyboard assembly comprises a field of twelve keys arranged in five columns 40—44 symmetrically layed out for either left or right hand operation by a single hand. As seen from the home keys (0—4—5—6—.), the column keys are offset and interlaced. This serves two important purposes, namely it provides a larger number of virtual keys so that 55 choices are available from twelve keys and it conforms to the normal contour of the human hand to make use more comfortable and more error free to avoid errors caused by fatigue or reach from or to an unnatural position of the fingers.

As may be seen the longer forefinger is accommodated by centermost offset column 42, whereas, index and ring fingers naturally meet and rest on columnar keys 41 and 43. The thumb and little fingers being the shortest then can find a position on the colums 40, 44. To conform to the offset columns the execute key 45 spans the three centermost columns. When this keyboard is used for telephone input, the two keys 45, 46 may carry * and # notation.

Figure 7 illustrates the key construction in profile sketch of a tiered keyboard such as the typewriter keyboard of Figure 2, as afforded by this invention.

Thus, each key on a lower one of the tiered rows has a raised edge portion 49 thereof extending into the adjacent upper tier to permit by a single fingerstroke the virtual key selection for simultaneously closing keyswitches located in two adjacent rows or tiers.

In accordance with this invention therefore another embodiment as shown in Figure 8 is particularly adapted for telephone use where a similar field arrangement of twelve keys is employed. Note that for special keyboards the use of nine keys can be used to provide twenty-five selections from nine keys and sixteen virtual keys, such as in telephone switchboard (PBX type) services where ten numerical digits are required plus control and switching signals. The twelve key layout with thirty-five selections shows that full alphabetic capabilities are feasible in telephone communications provided a mode change of the live keyboard functions from numeric to alphabetic mode is supplied, such as by operation of the # key.

If the system diagram of Figure 1 is considered, it is seen that this invention provides improved telephone switching systems. For example, the keyboard switch selection device 31 may produce tones compatible with telephone line transmission in response to key selections from keyboard 15 (or that of Figure 8). As seen from cable 49 these tones (up to forty-seven in number) are processable in the telephone system switchboard 50 which can connect in a telephone receiving station 51 (such as a computer) for handling alphanumeric data input. This keyboard assembly constitutes what is known in the art as a simple modem. Also it is seen that this invention permits a complex PBX type of switchboard used in telephone switching systems to be replaced by a simple twelve key standard telephone keyswitch assembly that produces an equivalent function that formerly required a large number of keyswitches while processing numerical data entires in a conventional way.

Having therefore advanced the state of the art, those novel features believed descriptive of the

spirit and nature of the invention are set forth with particularity in the claims.

**Claims**

1. A touch type data processor keyboard assembly of the type having a field of side-by-side keyswitches arranged for actuation of both selected individual keyswitches independently and multiplicities of side-by-side keyswitches concurrently bridgeable for actuation by one finger characterized in that tactile feedback markers sensed by a single finger to determine finger stroke registration positions for entry of a desired keyswitch signal extend over a plurality of at least two of the side-by-side keys.

2. A keyboard assembly as defined in claim 1 wherein the keyboard assembly is disposed on a surface consisting substantially of a surface contour in the form of a plurality of flat surfaces, a plurality of indentations and a plurality of raised surface portions disposed in a pattern to identify finger positions for operation of different keyswitch selections of both single keyswitches and combinations of more than one keyswitch.

3. The keyboard assembly defined in claim 2 wherein individual keys are placed side-by-side to define a set of intersections of two keys and a set of intersections of more than two keys, wherein said depressions identify the finger stroke positions for the individual keys, the flat surface at the intersections of two keys identify the finger stroke positions for bridging and actuating the sets of two keys concurrently, and the raised surface portions define the finger stroke positions for bridging and actuating concurrently the sets of more than two keys.

4. The keyboard assembly defined in claim 1 having a set of at least nine keys arranged in a single field of side-by-side keys for touch actuation by the fingers on a single hand including indicia defining on the keybpoard a set of data processing functions operable by a single finger stroke of selected keyswitches, the keyboard being coupled with a data processing system for both entering data characters and selection of data processing functional operations, each finger selection choice being identified by corresponding indicia defining the respective data characters and operational functions of the data processing system upon a finger stroke selection of the corresponding keyswitches, thereby to provide a complete set of manual entry keyswitches for entering data and operating said data processing system with the selections displayed by the indicia.

5. The keyboard assembly defined by claim 4 having a plurality of sets of indicia displayed, each set identifying finger selections for operation of the data processing system in a different operation mode, wherein selections displayed by said indicia are provided to actuate controls in said data processing system for establishing the different operation modes.

6. The keyboard assembly of claim 4 wherein the keyboard is operable in a mode with live keys permitting entry of a sequence of serially entered characters, one with each finger stroke, to form data words.

7. The keyboard assembly defined in claim 2, with keyswitches arranged in a symmetrical matrix of a plurality of rows and a plurality of columns of side-by-side keyswitches to provide a central position on each keyswitch a finger stroke position for actuating the keyswitches one at a time, a side-by-side position between adjacent key switches in the columns and rows to provide a finger stroke position for actuating the keyswitches two at a time, and row-column intersection positions to provide a finger stroke position for actuating the keyswitches four at a time.

8. The keyboard assembly defined in claim 7 with three columns and four rows of keyswitches laid out in a telephone keyboard format, identification indicia for the ten arabic digits 0—9 and two additional control functions on said central positions, and identification indicia for twenty-three additional finger stroke selections at the respective side-by-side and intersection finger stroke positions.

9. The keyboard assembly defined in claim 8 including one control function for changing between alphabetic and numerical modes,and indicia identifying the numerical keys as alphabetic characters in the alphabetic mode thereby to provide all twenty-six alphabetic characters plus a plurality of punctuation characters.

10. The keyboard assembly defined by claim 1 including a set of at least twenty-eight separate keys laid out in a single field with indicia identifying the set of individually actuated keyswitches with the alphabet characters in the layout pattern of a conventional typewriter keyboard, and having further indicia on the remaining sets of concurrently selectable keys defining further characters and data processing functions operable in an associated data processing system to be manually operated by said keyboard.

11. The keyboard assembly of claim 1 including switch selection means providing a set of signals significantly exceeding the number of keys on the keyboard, each derived by actuation of keys by a keyswitch stroke of a single finger.

12. The keyboard assembly of claim 1 wherein the keyboard surface is substantially flat.

13. The keyboard assembly of claim 1 wherein the keyboard surface is tiered to produce a plurality of rows of keys, wherein keys in lower ones of the tiered rows have portions thereof extending into the adjacent upper tier to permit by a single finger stroke the simultaneous closing of keyswitches located in two adjacent tiers

14. The keyboard assembly defined in claim 1, with keyswitches arranged in five columns disposed for comfortable placement of fingers on a hand in a natural home position on the keyboard in contact with five home keys, wherein the keys in the five columns are offset from the keys in

adjacent columns so that the middle column is extended beyond the two adjacent columns to thereby conform to the longer length of the middle finger.

15. The keyboard assembly defined in claim 14 having eleven keyswitches in said columns and one keyswitch bridging the three innermost columns thereby providing a set of fifty-five separate unique keyswitch selections by a single finger stroke.

16. The keyboard assembly defined in claim 1 providing a set of different audible tones for each of the unique keyswitch selections made by a single finger stroke.

17. The keyboard assembly defined in claim 16 coupled into a telephone switching system.

18. The keyboard assembly defined in claim 17 providing with a set of twelve keys a compact telephone system switchboard system providing both numerical digit signals plus a plurality of switchboard functions available on a PBX switchboard.

19. The keyboard assembly defined in claim 1 providing a symmetric matrix of twelve side-by-side keys in a 3-column four row array, providing a choice of more than 26 single finger stroke data entry positions, thereby accommodating the English alphabet.

20. The keyboard assembly defined in claim 19 coupled into a telephone switching system for the dual purpose of entering numerical information and providing further telephone systems switching and data signals.

21. A telephone keyboard assembly having a matrix of side-by-side keys consisting of twelve keys, with provisions for selecting from a live keyboard with a single finger stroke a plurality of selections greater than 12 by medium of providing signals in response to the simultaneous switching of two or more keys by a single finger stroke.

22. An assembly as defined in claim 21 coupled in a telephone system for performing both numerical data entry in a conventional manner and a plurality of switching functions in addition.

23. A keyboard layout for use by a single hand having features in combination comprising a symmetrical layout to thereby permit operation by either left or right hands, and offset columns of key positions conforming the columns of keys to fit the normal contour of the human hand with the center column for actuation of the forefinger accounting for the length of that finger compared to the others.

24. A touch type data processor keyboard assembly of the type having a field of side-by-side keyswitches having finger operable keys, output means operable for identification of both selected individual keyswitches independently and sets of a plurality of side-by-side keyswitches selected concurrently, and bridging structure for actuation by a single finger on the keyboard surface consisting of finger actuation positions on more than one of the side-by-side key surfaces shaped with tactile markers for finger registration to permit accurate simultaneous identification and selection of desired sets of multiple keys with a single finger stroke.

25. A touch type data processor keyboard assembly substantially as hereinbefore described with reference to the accompanying drawings.

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